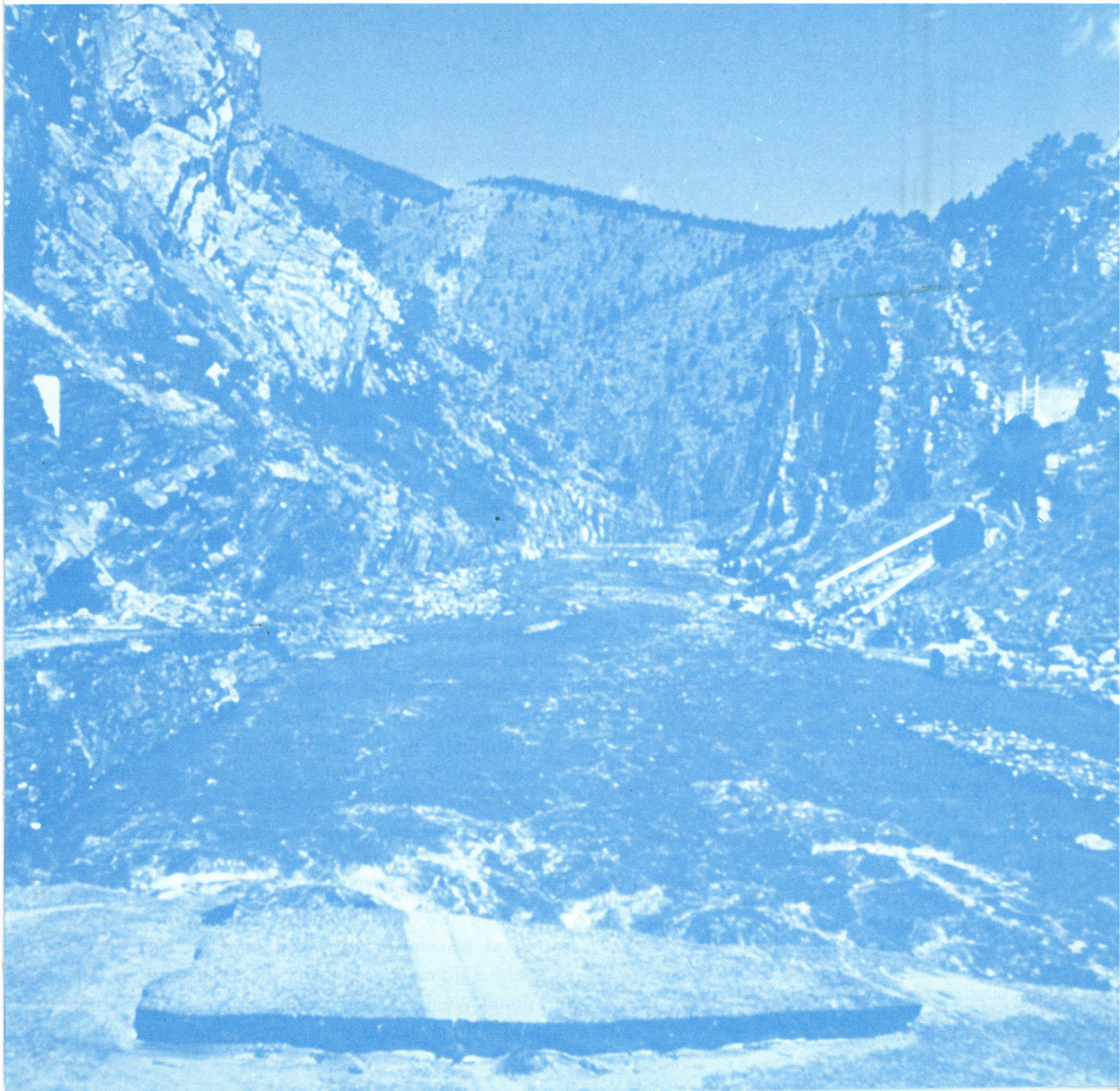


FLOODS, FLASH FLOODS and WARNINGS



U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration • National Weather Service

MOUNTAIN FLOODING

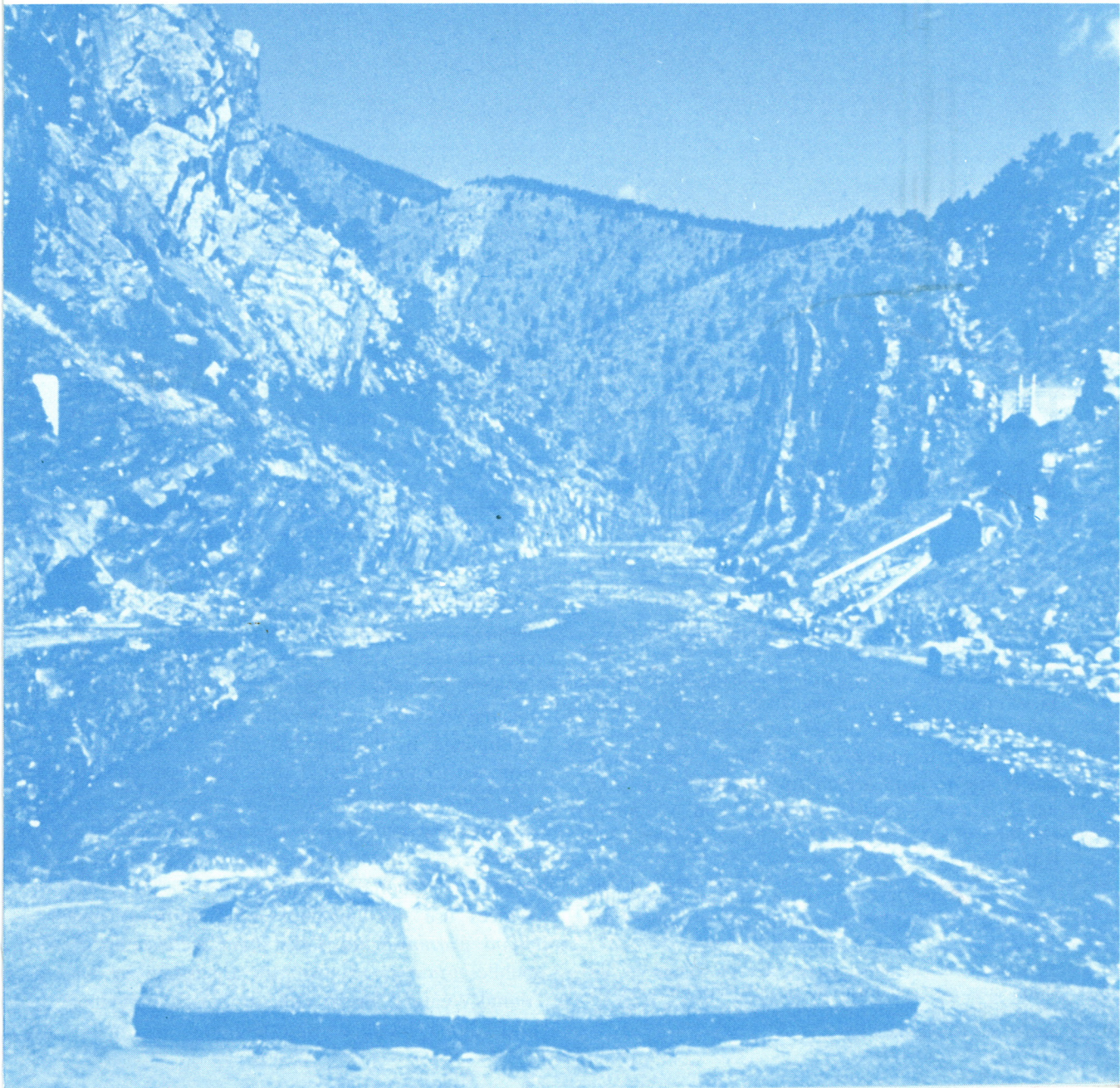


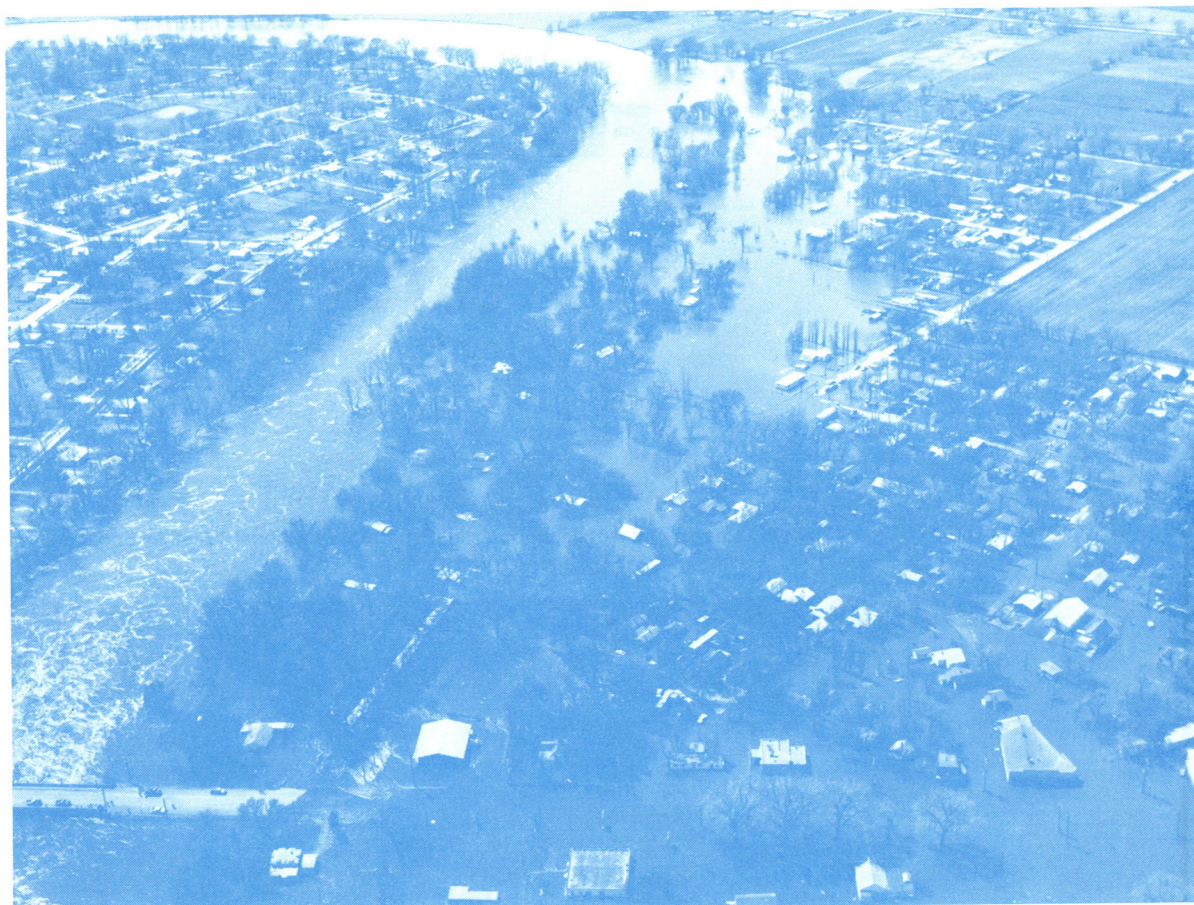
FLOODS, FLASH FLOODS and WARNINGS



U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration • National Weather Service

MOUNTAIN FLOODING





STREAM FLOODING

FLOODS, FLASH FLOODS AND WARNINGS

Floods are a natural and inevitable part of life along the rivers of our country. Some floods occur seasonally when winter or spring rains, coupled with melting snows, or torrential rains associated with tropical storms, drain small tributaries and fill river basins with too much water, too quickly. Other floods are sudden, resulting from heavy localized rainfall. These flash floods are raging torrents which rip through river beds, urban streets, coastal sections, and mountain canyons after heavy rains, and sweep everything before them.*

The transformation of a tranquil river into a destructive flood occurs hundreds of times each

* NOTE: Coastal flooding can also be caused by the storm surge associated with hurricanes. This phenomenon is described in publication NOAA/PA 78019, "Storm Surge and Hurricane Safety."

year throughout the United States. No area of the United States is completely free from the threat of floods. On the average, each year over 300,000 Americans are driven from their homes by floods; 200 persons are killed; and around \$2 billion worth of property is damaged or destroyed. Floods are also great wasters of water—one of our priceless natural resources.

NOAA, the U.S. Commerce Department's National Oceanic and Atmospheric Administration, keeps a round-the-clock, round-the-calendar surveillance on the Nation's rivers and is prepared to issue warnings when the threat of flooding occurs. A watch on Nation's river systems is maintained by National Weather Service River Forecast Centers located throughout the country. The River Forecast Centers produce flood forecasts for the major river systems and flash flood guidance for the smaller streams and headwater regions. National Weather Service Forecast Offices use this guidance information to issue *flood warnings* and *flash flood watches* to the public. *Flash flood warnings* are issued by National Weather Service Offices, that have the local and county warning responsibility.

RURAL FLOOD

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RURAL FLOODING

FLOOD WARNINGS

Flood warnings are issued as an advance notice that a flood is imminent or is in progress at a certain location or in a certain river basin. Floods begin when soil and vegetation cannot absorb falling rain or melting snow, and when water runs off the land in such quantities that it cannot be carried away quickly enough in normal stream channels; or cannot be retained in natural ponds and man-made reservoirs. The National Weather Service issues flood forecasts and warnings when the rain that has fallen is enough to cause rivers to overflow their banks, and when melting snow combines with rainfall to produce similar effects.

Flood forecasts and warnings along major tributaries can be issued hours to days in advance of the flood peak. On major rivers, flood forecasts can be issued days or even weeks in advance. This is because smaller streams can reach flood stage quickly while the rise on major rivers usually is more gradual.

Early flood warnings provide time for people in threatened areas to prepare, and by preparing to lessen damage from the flood.

- Residents of low-lying areas have time to move personal property, mobile equipment, and livestock to higher ground.
- Sometimes valuable crops can be harvested in advance of a destructive flood.
- Emergency and relief organizations can prepare to handle refugees and to combat the inevitable health hazards caused by floods.

Flood warnings are forecasts of impending floods, and are distributed to the public by the NOAA Weather Radio *, commercial radio and television, and through local emergency agencies. The warning message tells the expected degree of flooding, the affected river, when and where flooding will begin, and the expected maximum river level at specific forecast points during the event or flood crest. If you live in an area that experiences flooding periodically, prepare in advance for the possibility that you may have to

* NOAA Weather Radio provides continuous broadcasts of the latest weather information directly from National Weather Service offices. Taped weather messages are repeated every 4-6 minutes and will include watches, warnings, and statements. Most stations operate 24 hours daily.

URBAN FLOODING

face a flood, prepare to move personal property to higher ground, and make necessary preparations in advance.

FLASH FLOODS

A flash flood is possible in any area. Be alert.

A flash flood has occurred. Necessary preparations should be made.

No area is safe from a flash flood.

- On a river, a flash flood can occur quickly in a matter of minutes. Begin preparations before the flood begins.



URBAN FLOODING

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face a flood situation, listen for the flood warn-
ing, and when you hear it, respond quickly. Care-
ful preparation and prompt response will reduce
property loss and ensure personal safety.

FLASH FLOOD WATCH AND WARNINGS

A flash flood *watch* is issued when flash flooding
is possible within the designated watch area—
be alert.

A flash flood *warning* is issued when a flash
flood has been reported or is imminent—take
necessary precautions.

No area is immune to flash floods.

- On **small streams**, especially near the head-
waters of river basins, water levels may rise
quickly in heavy rainstorms, and flash floods can
begin before the rain stops falling. There is little
time between detection of flood conditions and

the arrival of the flood crest. Swift action is
essential to protect life and property.

- Flash floods also occur in or near **moun-
tainous** areas where torrential thunderstorm rains
can quickly change a dry water course or
trickling little brook into raging treacherous tor-
rents of water. Desert washes, particularly near
mountains, can go from dry to flood stage within
minutes as a result of thundershowers many miles
away and out of sight or hearing of the flash
flood site.

Urban flooding can occur in any terrain and
is particularly aggravated by urbanization where
natural cover has been removed by the construc-
tion of buildings, roads, and parking lots. Heavy
rains can result in flash flooding, inundating cars
and causing considerable damage to residential
and industrial properties located along the stream
channels. Streets can become rivers and base-
ments, indoor swimming pools! National Weather
Service flash flood or flood warnings and state-
ments will advise you of areas where flooding is
most likely to occur. Remember, safety for your
family and property depends upon you! Learn
to recognize environmental clues and to act
quickly.



COASTAL FLOODING

FLOOD SAFETY RULES

Before the flood:

- Keep materials on hand such as sandbags, plywood, plastic sheeting, and lumber.
- Install check valves in building sewer traps to prevent flood water from backing up in sewer drains.
- Arrange for auxiliary electrical supplies for hospitals and other operations which are critically affected by power failure.
- Keep first aid supplies at hand.
- Keep your automobile fueled; if electric power is cut off, filling stations may not be able to operate pumps for several days.
- Keep a stock of food that requires little cooking and no refrigeration; electric power may be interrupted.
- Keep a portable radio, emergency cooking equipment, lights and flashlights in working order.
- Know your elevation above flood stage.
- Know your evacuation route.

When you receive a flood warning:

- Store drinking water in clean bathtubs and in various containers. Water service may be interrupted.
- If forced to leave your home, and time permits, move essential items to safe ground; fill fuel tanks to keep them from floating away; grease immovable machinery.
- Move to a safe area before access is cut off by flood water.

During the flood:

- Avoid areas subject to sudden flooding.
- Do not attempt to cross a flowing stream where water is above your knees.
- Do not attempt to drive over a flooded road—you can be stranded or trapped. The depth of water is not always obvious.

After the flood:

- Do not use fresh food that has come in contact with flood waters.
- Boil drinking water before using. Wells should be pumped out and the water tested for purity before drinking.
- Seek necessary medical care at nearest hospital. Food, clothing, shelter, and first aid are available at Red Cross shelters.
- Do not visit disaster areas; your presence might hamper rescue and other emergency operations.
- Do not handle live electrical equipment in wet areas; electrical equipment should be checked and dried before being returned to service.
- Use flashlights, not lanterns or torches, to examine buildings, flammables may be inside.
- Report broken utility lines to appropriate authorities.

FLASH FLOODS

Flash flood waves, moving at incredible speeds, can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Killing walls of water can reach heights of 10 to 20 feet. You won't always have warning that these deadly, sudden floods are coming.

WHEN A FLASH FLOOD WARNING IS ISSUED FOR YOUR AREA OR THE MOMENT YOU FIRST REALIZE THAT A FLASH FLOOD IS IMMINENT, ACT QUICKLY TO SAVE YOURSELF. YOU MAY HAVE ONLY SECONDS.

- Get out of areas subject to flooding. This includes dips, low spots, canyons, washes, etc.
- Avoid already flooded and high velocity flow areas. Do not attempt to cross a flowing stream on foot where water is above your knees.
- If driving, know the depth of water in a dip before crossing. The road bed may not be intact under the water.
- If the vehicle stalls, abandon it immediately and seek higher ground—rapidly rising water may engulf the vehicle and its occupants and sweep them away.
- Be especially cautious at night when it is harder to recognize flood dangers.
- Do not camp or park your vehicle along streams and washes, particularly during threatening conditions.

DURING ANY FLOOD EMERGENCY, STAY TUNED TO YOUR NOAA WEATHER RADIO, COMMERCIAL RADIO, OR TELEVISION STATION. INFORMATION FROM NOAA AND CIVIL EMERGENCY FORCES MAY SAVE YOUR LIFE.



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